Desired Future Habitat Conditions
Pool 5, Mississippi River

Description Of Pool 5

Pool 5 is an impoundment of the Mississippi River resulting from the construction of Lock and Dam 5. Construction of lock and dam 5 was completed in 193_ to support operation of the 9' navigation channel. Pool 5, for the purposes of this plan, includes that reach of river from near Alma, WI (river mile 752.8) downstream to Lock and Dam 5 below Minneiska, MN (river mile 738.2). In general, the east and west boundaries of the Pool 5 planning area are the tops of the river bluffs on either side of the river including its floodplain and that of its tributaries where they enter the Mississippi. The Pool 5 area encompasses 12,300 acres.

This pool, like Pools 3-9, forms the boundary between Wisconsin and Minnesota. The floodplain is relatively wide, with an extensive mosaic of floodplain lakes, channels, sloughs, and delta areas in the upper and middle portions of the pool, and more open water conditions in the lower end of the pool. Pool 5 represents a significant corridor of open space and habitat for both aquatic and terrestrial plants and animals.

Significant tributaries which enter Pool 5 include the Zumbro and Whitewater Rivers. The Zumbro River is the largest tributary to enter Pool 5, at approximately river mile 750. Much of the lower Zumbro River has been channelized and leveed. The Whitewater River is the second largest tributary, and has been identified as the most significant source of sediment to the Mississippi River for a tributary it's size. Several small creeks also contribute flow, including three trout streams.

Considerable public lands exist in this area including U.S. Fish and Wildlife refuge lands, the MN DNR's McCarthy Wildlife Management Area, and the MN DNR's Weaver Dunes Scientific and Natural Area. Alma and Buffalo City, WI are the only significant urban sites within the boundaries of the pool.

Description of Pool 5 Sub-Areas

Several identifiable areas are present within Pool 5. The boundaries of these areas can be roughly defined based on hydrologic units (i.e. main channel, tributary deltas, or bluffs). The following areas have been delineated to facilitate presentation of desired future habitat conditions in the pool:

Finger Lakes: The Finger Lakes includes six backwater lakes immediately below the dike at Lock and Dam #4. These lakes (Clear, Lower Peterson, First, Second, Third, Schmoker's) provide good habitat for fish and wildlife, with abundant aquatic vegetation throughout most areas. Finger Lakes was the site of an extensive HREP project completed in 1996 designed to improve overwintering habitat of centrarchids by introducing flow into several backwater lakes.

Mozeman's Slough/Lizzy Paul's: This area is a series of small backwater lakes and sloughs that provide good habitat quality for fish and wildlife. Aquatic vegetation is abundant in some locations.

Island 42: Island 42 is bounded by the main channel to the east and West Newton Chute to the west. Numerous backwater lakes, sloughs, and flowing channels dissect the area, with abundant aquatic vegetation and excellent habitat for fish and wildlife throughout. Island 42 was the site of the first HREP project, which involved dredging and flow reduction to increase overwintering fish habitat.

Zumbro River Delta: Historically, the Zumbro River floodplain was dissected by numerous channels and seasonally isolated lakes and ponds. Flows moved laterally within the floodplain, sometimes north towards what is now Pool 4, while at other times flowing south into what is now Pool 5. During flood events, the Zumbro River flowed in both directions across a diverse and natural floodplain. In the mid 1900's, approximately the lower 4 miles of the Zumbro River was straightened and isolated from it's floodplain by levees. Additionally, when Wabasha Co. 24 was elevated it severely restricted floodplain and channel connectivity with the Mississippi River. Remnant channels, floodplain depressions and wetlands throughout the historic Zumbro River delta are all that remain from what was once a very dynamic floodplain ecosystem. The area is now only inundated when Mississippi River water levels become high enough for water to either backup or seep into these areas. There also has been a large net loss of floodplain forest, prairie, and wetland habitats due to most of the area being converted to agricultural use.

Weaver Bottoms: The Weaver Bottoms sub-area is bordered by the main channel to the east and the Minnesota mainland to the north, west and south. Historically this 4,000 acre complex was important for migrating waterfowl and wintering fish. This use was due in large part to extensive beds of emergent and submergent vegetation. Since the late-1960's, Weaver Bottoms has degraded to a large, wind-swept lake. Declines in vegetation severely reduces its value for fish and wildlife. Past channel maintenance efforts to improve habitat have shown little success in restoring aquatic vegetation in Weaver Bottoms. Further measures to improve aquatic vegetation in this area is warranted.

Whitewater River Delta: The Whitewater River enters the Mississippi in the southwestern portion of Weaver Bottoms. Intensive agricultural use in the Whitewater watershed resulted in severe erosion and sediment loading into Weaver Bottoms. Much of this sediment has accumulated at the mouth, expanding the Whitewater River delta. This area is dissected by numerous distributary channels, and has a diversity of emergent and submergent aquatic vegetation and terrestrial plant communities.

Belvidere Slough/Spring Lake: This is a large area with backwater lakes, sloughs, and flowing channels located near Buffalo City, WI. Belvidere Slough provides significant flow to the area. Following impoundment, the Spring Lake areas was very diverse with numerous islands and deep water areas, as well as abundant vegetation. It provided excellent fish and wildlife habitat. Currently, the Spring Lake area has lost much of it's bathymetric and topographic diversity due to sedimentation and island loss. Consequently, fish and wildlife habitat has also declined. Spring Lake was the site of an early HREP project designed to reduce flow and sedimentation into the area. The area is currently under consideration for an intensive HREP project that would include island construction and dredging.

Lower Pool 5: Lower Pool 5 includes the area from Spring Lake/Weaver Bottoms downstream to Lock and dam 5a. This area is a large expanse of open water. Wind fetch is significant and has contributed to island loss in Spring Lake and Weaver Bottoms. As sediment continues to fill this area, some small islands are forming naturally in the upper reaches. Flow moves laterally through the area. Aquatic vegetation is present but much reduced from historical abundance.

Unique Attributes, Opportunities And Constraints

Private landowners will be encouraged and provided with incentives to protect and restore native plant communities on their riparian and floodplain lands, especially in the Zumbro River Bottoms area. The sand prairies somewhat unique to Pool 5 will be expanded and restored, providing excellent habitat for Blanding's Turtles and other wildlife.

The Mississippi River in this area once supported more than 40 species of freshwater mussels and migratory fish once moved through this reach on their way to spawning grounds and wintering areas. With improvements to water quality and the physical integrity of these rivers, the opportunity to reestablish populations of lost species presents itself and will occur in the future.

Summary of Actions to Achieve Desired Future Habitat Conditions

Many of the proposed actions are interrelated. Often solutions to problems will require implementation of more than one action. Likewise, single actions may address more than one problem. The over arching goal of these actions is to increase the productivity of the river ecosystem using all feasible means.

1.) Maintain existing quality habitats.

A key to the desired future is to protect and maintain existing terrestrial and aquatic habitat. Some areas within the pool are considered as quality habitat for a variety of species. Maintenance of existing quality habitat may be as simple as leaving it alone and monitoring it's condition. Specific actions would be identified if long-term declines in habitat quality in the area are noticed.

2.) Support watershed management programs.

Watershed management programs, like the Whitewater Watershed Project, should be encouraged to promote good land use which will reduce sediment and nutrient inputs into the Mississippi River. Urban sewage and stormwater treatment should be included in these programs.

3.) Manage water levels to improve aquatic habitat.

Pool 5 was one of four pools considered by the Water Level Management Task Force (St. Paul District) in 1997 as a pilot pool for an experimental summer drawdown. The task force chose Pool 8, primarily due to lower dredging costs to maintain navigation channel depths, and has scheduled a summer drawdown as soon as river flows allow. Public support for Pool 5 was high, and a similar effort has been initiated.

The process used for planning the Pool 8 drawdown was considered very successful, and serves as a guide for Pool 5. The Water Level Management Task Force has taken a lead role and is obtaining technical information necessary to implement a drawdown. The Weaver Citizens Committee in conjunction with the MN/WI Boundary Area Commission has taken lead responsibility for public involvement. The extent of drawdown could range from 2 ft to open river conditions, depending upon final cost and public input. A drawdown would be implemented as soon as possible and be repeated as necessary to maintain emergent aquatic vegetation.

4.) Protect and restore islands.

Islands would be constructed using 1941 aerial photos as a template combined with current bathymetry and flow information. Floodplain structure in the form of islands will be restored and enhanced in the Weaver Bottoms, Krueger Slough, Lost Island, Spring Lake, and lower Pool 5 sub-areas. Measures to reduce sediment resuspension in these areas will reduce sediment input to backwaters located in Upper Pool 5A. Reduction in sediment resuspension will also improve environmental conditions for the establishment and maintenance of aquatic vegetation. Projects in these areas will also improve habitat diversity and quality through the promotion of secondary and tertiary channel development and diversification of water velocities in the impounded reach. The desire is to convert a significant portion

of area currently classified as impounded into contiguous backwaters and improve existing backwater communities.

Island would be constructed based on past HREP successes, and would be topped with substrate generated by dredging historical fish wintering areas in. Islands would be seeded with native grasses and trees.

5.) Increase depth diversity in channels and backwaters.

Island erosion and sedimentation have resulted in reduced bathymetric diversity in backwater areas. Dredging and island construction to concentrate flows, especially in the Weaver Bottoms, Spring Lake, and the lower pool will improve bathymetric diversity. Dredging to increase depth for overwintering fish habitat will be completed at historical overwintering sites.

6.) Manage river flows and connectivity to improve aquatic habitat.

Some of the best and most diverse habitat in the UMR is associated with the mosaic of small flowing channels, ponds, sloughs, embayments, natural levees, delta islands and associated plant communities. Some backwater areas in Pool 5 receiving flow are developing these deltaic patterns at the mouths of side channels. There are several complete closing structures along the main channel and side channels that if modified or removed would increase flow into Weaver Bottoms. These closing structures could be removed partially or entirely to increase flows, promoting the development of channels and may eventually produce the mosaic described above. If any flow reintroduction is found to be counter productive, it could easily be reversed or modified. Island formation will also help to increase flow diversity, especially in Spring Lake, Weaver Bottoms, and the area immediately above Lock and dam 5.

Flowing channels off the Zumbro River to connect floodplain habitats to channel areas in the Weaver Bottoms and north Zumbro River areas will be evaluated.

Alternatives to allow fish movement between Pools 4 and 5 will be evaluated. These include: restoration of the distributary channels of the Zumbro River, which will flow both north to Pool 4 and south in Pool 5 during high water events, and structures or operation of Lock and Dam 4. Fish passage alternatives between Pools 5 and 5a will also be evaluated. These may include the addition of spillways in the existing dike separating the two pools, changes in the operation of Lock and Dam 5, and structure measures such as a fishway.

Modifications of the Lock and Dam 5 dike will also be evaluated to improve the distribution of flood flows in the Whitman WMA/Merrick State Park sub-area of Pool 5A. Improving the distribution of flood flows in the upper end of Pool 5A should reduce sedimentation in these backwater systems.

7.) Work cooperatively with private property owners.

There are several areas within the Mississippi River floodplain and the majority of the tributary watersheds which are privately owned. Maintaining and improving habitat within the floodplain of the Mississippi is dependent on a long-term commitment to provide resources to private landowners to improve water quality, reduce erosion and sedimentation, and improve habitat conditions on land within the floodplain. Various approaches and techniques will be evaluated and implemented to work cooperatively with private property owners. Some of the tools include: voluntary measures, land owner incentives, easements from willing owners and purchase of land from willing sellers. An area of Pool 5 which will be focused on for working with private property owners is the Zumbro River Delta.

This is a long-term effort requiring acquisition or floodway easements from willing sellers on 5000 acres primarily along the Zumbro River, of which approximately one-half are critical for project success and are of highest priority. There are currently twenty-seven landowners that farm in the project area. All of the land within project boundaries is floodplain and located along and adjacent to historic channels and floodplain depressions. Eventually, dike removal or installation of culverts, bridges or spillways along the portion of the lower Zumbro River east of Kellogg through a township road and both Wabasha Co. 24 and 84 road embankments would be necessary.

This project is totally dependent on willing sellers which may arise from financial and/or contractual flexibility. As such, funding mechanisms must be in place that allow flexibility and take advantage of unique opportunities such as major floods when landowners are more interested in selling. Partnerships with non-governmental agencies, such as The Nature Conservancy, would lend expertise and encourage development of a long-term program for acquisition, as well as leverage additional funding.

8.) **Manage floodplain forest and prairie communities for diversity and quality.**

Much of the Zumbro River bottoms area will be restored to native plant communities following acquisition or easements purchased from willing sellers. The levee will be breached in several locations and sediment and nutrients will distributed more naturally throughout the floodplain during high flow events. Meandering, distributed channels will create permanent and seasonal wetlands. In addition, larger areas of floodplain forest and native prairie will become established. This area will connect with the McCarthy Wildlife Management Area and Weaver Dunes Scientific and Natural Area to the south, and U.S. Fish and Wildlife Service Refuge lands to the north providing a several thousand acre complex of prairie, forest, and marsh, with intermittent agricultural areas.